



# Trunk Conditioning Enhancements on Cisco MC3810 Series Concentrators

---

This document describes enhancements introduced in Cisco IOS Release 12.0(7)XK that expand the trunk-conditioning feature on the Cisco MC3810.

This document includes the following sections:

- Feature Overview on page 1
- Related Documents on page 2
- Supported Platforms on page 2
- Supported Standards, MIBs, and RFCs on page 2
- Prerequisites on page 2
- Configuration Tasks on page 2
- Configuration Examples on page 5
- Command Reference on page 7
- Debug Commands on page 23

## Feature Overview

Cisco MC3810 series concentrators support additional trunk-conditioning commands that specify various trunk-conditioning timing, signaling, and transmission options.

## Benefits

These additional commands provide the following benefits:

- Enhanced control over rerouting of calls in cases of trunk failure
- Increased bandwidth availability due to suppression of voice packets on out-of-service trunks

## Restrictions

Trunk conditioning is not supported on trunks using common channel signaling (CCS) protocols.

## Related Documents

- *Voice over Frame Relay Using FRF.11 and FRF.12*, Online document for Cisco IOS Release 12.0(4)T

## Supported Platforms

- Cisco MC3810 series

## Supported Standards, MIBs, and RFCs

North America Channel Associated Signaling (CAS) protocol.

## Prerequisites

The trunk-conditioning enhancements described in this document require Cisco IOS Release 12.0(7)XK or later.

## Configuration Tasks

This feature module describes procedures for configuring trunk conditioning on Cisco MC3810 series concentrators.

## Configuring Trunk Conditioning

### Configuring a Voice Class to Define Trunk Conditioning Attributes

In conjunction with the configuration for permanent connections (Cisco trunks and FRF.11 trunks), you can define a voice class and configure specific signaling attributes to the voice class, and then map the voice class to a dial peer.

To configure a voice class to define trunk conditioning attributes, including signaling attributes, use the following commands beginning in global configuration mode:

Step	Command	Purpose
1	<code>router(config)# <b>voice class permanent tag</b></code>	Create a voice class for Cisco trunk (private line) or FRF.11 trunk calls. The range for the <i>tag</i> number is 1 to 10000. The <i>tag</i> number must be unique on the router.
2	<code>router(config-voice-class)# <b>signal keepalive seconds</b></code>	(Optional) Configure the keepalive signaling packet interval in seconds for Cisco trunk (private line) calls. The range for <i>seconds</i> is 1 to 65535; the default is 5.

Step	Command	Purpose
3	<code>router(config-voice-class)# signal sequence oos {no-action   idle-only   oos-only   both}</code>	(Optional) Change the signaling pattern to be sent to the PBX whenever the far-end keepalive message is lost, or when AIS is received from the far end. Select <b>no-action</b> to send no signaling pattern. Select <b>idle-only</b> or <b>oos-only</b> to send only one signaling pattern. Select <b>both</b> or the <b>no</b> form to restore the default (both signaling patterns are sent).
4	<code>router(config-voice-class)# signal pattern {idle receive   idle transmit   oos receive   oos transmit} signal-pattern</code>	(Optional)—Use only to override the default values for the idle patterns and receive out-of-service (OOS) pattern, or to configure an OOS transmit signaling pattern. Configure the signaling pattern (ABCD bit pattern) for Cisco trunk (private line) calls. Configure both <b>idle receive</b> and <b>idle transmit</b> for the idle state. Configure both <b>oos receive</b> and <b>oos transmit</b> for the OOS state. The receive signaling pattern is from the data network side to the PBX. The transmit signaling pattern is from the PBX to the data network side. The range for all options is 0000 to 1111.  If this command is not entered, the default signal patterns are used. See the command reference for defaults.  Repeat the command entry for each signal pattern required.
5	<code>router(config-voice-class)# signal timing oos timeout seconds   disabled</code>	(Optional) Do one of the following: <ul style="list-style-type: none"> <li>Change the timeout period for asserting a receive OOS pattern to the PBX when signaling packets are lost. This changes the delay time before a busyout is sent to the PBX.</li> <li>Disable packet loss detection. This disables the detection of loss of the keepalive signal.</li> </ul> The range for the timeout period is 1 to 65535 seconds; the default is 30 seconds.
6	<code>router(config-voice-class)# signal timing oos restart seconds</code>	(Optional) Configure permanent voice connections to be torn down and restarted after the trunk has been OOS for a specified time.  The range for the waiting time is 0 to 65535 seconds. <b>Note</b> This command is ineffective if <b>signal timing oos timeout</b> is <b>disabled</b> .
7	<code>router(config-voice-class)# signal timing oos slave-standby seconds</code>	(Optional) Configure a slave port to return to its initial standby state after the trunk has been OOS or a specified time.  The range for the waiting time is 0 to 65535 seconds. <b>Note</b> This command is ineffective if <b>signal timing oos timeout</b> is <b>disabled</b> .
8	<code>router(config-voice-class)# signal timing oos suppress-all   suppress-voice seconds</code>	(Optional) Configure the router or concentrator to stop sending voice packets or voice and signaling packets to the network if it detects a transmit OOS signaling pattern from the PBX for a specified time.  The range for the waiting time is 0 to 65535 seconds. <b>Note</b> You must also configure an OOS transmit signaling pattern with the <b>signal pattern oos transmit</b> command (Step 4.)
9	<code>router(config-voice-class)# signal timing idle suppress-voice seconds</code>	(Optional) Configure the router or concentrator to stop sending voice packets after the trunk has been idle for a specified time.  The range is 0 to 65535 seconds.
10	<code>router(config-voice-class) #exit</code>	Exit from voice-class configuration mode.

## Applying Voice Class Signaling Attributes to Dial Peers or Voice Ports

After you have created the voice class, assign it to a network dial peer (VoFR, VoATM, or VoIP) or to a voice port. You cannot assign voice-class signaling attributes to POTS dial peers.

### Applying a Voice Class to a Network Dial Peer

To apply voice-class signaling attributes to a network dial peer, use the following commands beginning in global configuration mode:

Step	Command	Purpose
1	<code>router(config)# dial-peer voice tag {vofr   voatm   voip}</code>	Define a VoFR, VoATM, or VoIP dial peer and enter dial-peer configuration mode. All subsequent commands that you enter in dial-peer voice mode before you exit will apply to this dial peer.  The <i>tag</i> is a number that identifies the dial peer and must be unique on the router. Do not assign duplicate tag numbers.
2	<code>router(config-dialpeer)# voice-class permanent tag</code>	Assign to the dial peer the voice class that you created in the “Configuring a Voice Class to Define Trunk Conditioning Attributes” section.  <b>Note</b> The <b>voice-class</b> command in dial-peer configuration mode is entered with a hyphen. The <b>voice class</b> command in global configuration mode is entered without the hyphen.

### Applying a Voice Class to a Voice Port

To apply voice-class signaling attributes to a voice port, use the following commands beginning in global configuration mode:

Step	Command	Purpose
1	For Cisco MC3810 series analog voice ports: <code>router(config)# voice-port slot/port</code>  For Cisco MC3810 series digital voice ports: <code>router(config)# voice-port slot:ds0-group</code>	Identify the voice port you want to configure and enter voice-port configuration mode.
2	<code>router(config-voiceport)# voice-class permanent tag</code>	Assign to the voice port the voice class that you created in the “Configuring a Voice Class to Define Trunk Conditioning Attributes” section.  <b>Note</b> The <b>voice-class</b> command in voice-port configuration mode is entered with a hyphen. The <b>voice class</b> command in global configuration mode is entered without the hyphen.

## Configuration Examples

The following example configures a voice class using default idle and OOS signaling patterns, and configures busyout after 60 seconds to the PBX, with restart after 120 seconds. This example applies the voice class to both a Voice over Frame Relay dial peer and a Voice over ATM dial peer:

```
router(config)# voice class permanent 10
router(config-class)# signal keepalive 10
router(config-class)# signal timing oos timeout 60
router(config-class)# signal timing idle suppress-voice 5
router(config-class)# signal timing oos restart 120
router(config-class)# exit
router(config)# dial peer voice vofr 10
router(config-dial-peer)# voice-class permanent 10
router(config-dial-peer)# exit
router(config)# dial peer voice voatm 20
router(config-dial-peer)# voice-class permanent 10
router(config-dial-peer)# exit
```

The following example configures a voice class with specified signaling bit patterns for the idle receive, idle transmit, OOS receive, and OOS transmit states, and it configures busyout after 90 seconds to the PBX, with restart after 240 seconds. This example applies the voice class to digital voice port 0:5 on a Cisco MC3810:

```
router(config)# voice class permanent 30
router(config-class)# signal keepalive 10
router(config-class)# signal pattern idle receive 0101
router(config-class)# signal pattern idle transmit 0101
router(config-class)# signal pattern oos receive 0001
router(config-class)# signal pattern oos transmit 0001
router(config-class)# signal timing oos timeout 90
router(config-class)# signal timing idle suppress-voice 5
router(config-class)# signal timing oos restart 240
router(config-class)# exit
router(config)# voice-port 0:5
router(config-voiceport)# voice-class permanent 30
```

## Verifying Signaling Settings

To display the status of trunk-conditioning signaling and timing parameters for a voice port, enter the **show voice trunk-conditioning signaling** or the **show voice trunk-conditioning signaling summary EXEC** command.

The following is a sample display from the **show voice trunk-conditioning signaling summary** command for voice ports on a Cisco MC3810:

```
router# show voice trunk-conditioning signaling summary

1/1 is shutdown
1/4 is shutdown
1/5 :
TX INFO :slow-mode seq#= 25, sig pkt cnt= 40, last-ABCD=0000
hardware-state ACTIVE signal type is NorthamericanCAS signal path is OPEN
RX INFO :slow-mode, sig pkt cnt= 36, prev-seq#= 25, last-ABCD=0000
```

The following is a sample display from the **show voice trunk-conditioning signaling** command for voice port 1/5 on a Cisco MC3810:

```
router# show voice trunk-conditioning signaling 1/5

1/5 :
TX INFO :slow-mode seq#= 25, sig pkt cnt= 42, last-ABCD=0000
hardware-state ACTIVE signal type is NorthamericanCAS
signal path is OPEN
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
RX INFO :slow-mode, sig pkt cnt= 37
missing = 0, out of seq = 0, very late = 0
playout depth = 0 (ms), refill count = 1
prev-seq#= 25, last-ABCD=0000
trunk_down_timer = 4212 (ms), idle timer = 0 (sec),
tx_oos_timer = 0 (sec), rx_ais_duration = 0 (ms)
forced playout signal pattern = NONE
signaling playout history
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
```

To display the status of trunk supervision and configuration parameters for a voice port, enter the **show voice trunk-conditioning supervisory** or the **show voice trunk-conditioning supervisory summary EXEC** command.

The following is a sample display from the **show voice trunk-conditioning supervisory summary** command for voice ports on a Cisco MC3810:

```
router# show voice trunk-conditioning supervisory summary

1/1 is shutdown
1/4 is shutdown
1/5 : state : TRUNK_SC_CONNECT, voice : on , signal : on ,slave
```

The following is a sample display from the **show voice trunk-conditioning supervisory** command for voice port 1/5 on a Cisco MC3810:

```
router# show voice trunk-conditioning supervisory 1/5

1/5 : state : TRUNK_SC_CONNECT, voice : on, signal : on, slave
status: trunk connected
sequence oos : idle and oos
pattern :rx_idle = 0x0 rx_oos = 0xF tx_oos = 0xF
timing : idle = 0, restart = 0, standby = 0, timeout = 40
supp_all = 50, supp_voice = 0, keep_alive = 5
timer: oos_ais_timer = 0, timer = 0
```

## Command Reference

This section documents new or modified commands. Modified commands are indicated by an asterisk (\*). All other commands used on these platforms are documented in the Cisco IOS Release 12.0 command reference publications.

- **show voice trunk-conditioning signaling**
- **show voice trunk-conditioning supervisory**
- **signal pattern\***
- **signal sequence oos\***
- **signal timing idle suppress-voice\***

## show voice trunk-conditioning signaling

To display the status of trunk-conditioning signaling and timing parameters for a voice port, use the **show voice trunk-conditioning signaling EXEC** command.

**show voice trunk-conditioning signaling** [**summary** | *voice-port*]

### Syntax Description

**summary** (Optional) Show a summary of the status for all voice ports on the router or concentrator.

*voice-port* (Optional) Show a detailed report for a specified voice port.

### Command Mode

EXEC

### Command History

Release	Modification
12.0(3)XG and 12.0(4)T	This command was introduced on the Cisco MC3810 as <b>show voice permanent-call</b> .
12.0(7)XK	This command was renamed <b>show voice trunk-conditioning signaling</b> .

### Usage Guidelines

This command displays the trunk signaling status for analog and digital voice ports on Cisco MC3810 concentrators.

### Sample Display

The following is a sample display from the **show voice trunk-conditioning signaling summary** command for voice ports on a Cisco MC3810:

```
router# show voice trunk-conditioning signaling summary

1/1 is shutdown
1/4 is shutdown
1/5 :
TX INFO :slow-mode seq#= 25, sig pkt cnt= 40, last-ABCD=0000
hardware-state ACTIVE signal type is NorthamericanCAS signal path is OPEN
RX INFO :slow-mode, sig pkt cnt= 36, prev-seq#= 25, last-ABCD=0000
```

The following is a sample display from the **show voice trunk-conditioning signaling** command for voice port 1/5 on a Cisco MC3810:

```
router# show voice trunk-conditioning signaling 1/5

1/5 :
TX INFO :slow-mode seq#= 25, sig pkt cnt= 42, last-ABCD=0000
hardware-state ACTIVE signal type is NorthamericanCAS
signal path is OPEN
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
RX INFO :slow-mode, sig pkt cnt= 37
missing = 0, out of seq = 0, very late = 0
playout depth = 0 (ms), refill count = 1
prev-seq#= 25, last-ABCD=0000
trunk_down_timer = 4212 (ms), idle timer = 0 (sec),
tx_oos_timer = 0 (sec), rx_ais_duration = 0 (ms)
forced playout signal pattern = NONE
signaling playout history
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
```

The following is a sample display from the **show voice trunk-conditioning signaling summary** command for voice ports on a Cisco 3600:

```
router# show voice trunk-conditioning signaling summary

2/0/0 is shutdown
2/0/1 is shutdown
3/0:0 8 is shutdown
3/0:1 1 is shutdown
3/0:2 2 is shutdown
3/0:3 3 is shutdown
3/0:5 5 is shutdown
3/0:6(6) :
  status :
3/0:7 7 is shutdown
3/1:0 8 is shutdown
3/1:1 1 is shutdown
3/1:3 3 is shutdown
3/1:5 5 is shutdown
3/1:7 7 is shutdown
```

The following is a sample display from the **show voice trunk-conditioning signaling** command for voice port 3/0:6 on a Cisco 3600:

```
router# show voice trunk-conditioning signaling 3/0:6

hardware-state ACTIVE signal type is NorthamericanCAS
status :
forced playout pattern = STOPPED
trunk_down_timer = 0, rx_ais_duration = 0, idle_timer = 0
```

Table 1 explains the fields in the sample output.

**Table 1 Field Descriptions for show voice trunk-conditioning signaling Command**

<b>Field</b>	<b>Description</b>
current timer	Time since last signaling packets were received.
forced playout pattern	Which forced playout pattern is sent to PBX: 0 = no forced playout pattern is sent 1 = receive IDLE playout pattern is sent 2 = receive OOS playout pattern is sent
hardware-state	Hardware state based on received IDLE pattern: IDLE = both sides are idle ACTIVE = at least one side is active
signal type	Signaling type used by lower level driver: Northamerica, MELCAS, transparent, or external.
idle timer	Time the hardware on both sides has been in idle state.
last-ABCD	Last received or transmitted signal bit pattern.
max inter-arrival time	Maximum interval between received signaling packets.
missing	Number of missed signal packets.
mode	Signaling packet generation frequency: fast mode = every 4 milliseconds slow mode = same frequency as keepalive timer
out of seq	Number of out-of-sequence signal packets.
playout depth	Number of packets in playout buffer.
prev-seq#	Sequence number of previous signaling packet.
refill count	Number of packets created to maintain nominal length of playout packet buffer.
rx_ais_duration	Time since receipt of AIS indicator.
seq#	Sequence number of signaling packet.
sig pkt cnt	Number of transmitted or received signaling packets.
signal path	Status of signaling path.
signaling playout history	Signaling bits received in last 60 milliseconds.
trunk_down_timer	Time since last signaling packets were received.
tx_oos_timer	Time since PBX started sending OOS signaling pattern defined by <b>signal pattern oos transmit</b> .
very late	Number of very late signaling packets.

## Related Commands

<b>Command</b>	<b>Description</b>
<b>show dial-peer voice</b>	Displays the configuration for all VoIP and POTS dial peers configured on the router.
<b>show voice dsp</b>	Shows the current status of all DSP voice channels.
<b>show voice port</b>	Displays configuration information about a specific voice port.
<b>show voice trunk-conditioning supervisory</b>	Displays the status of trunk supervision and configuration parameters for voice ports.

## show voice trunk-conditioning supervisory

To display the status of trunk supervision and configuration parameters for voice ports, use the **show voice trunk-conditioning supervisory** EXEC command.

**show voice trunk-conditioning supervisory** [**summary** | *voice-port*]

### Syntax Description

**summary** (Optional) Show a summary of the status for all voice ports on the router or concentrator.

*voice-port* (Optional) Show a detailed report for a specified voice port.

### Command Mode

EXEC

### Command History

Release	Modification
12.0(7)XK	This command was introduced on the Cisco MC3810.

### Usage Guidelines

This command displays the trunk supervision and configuration status for analog and digital voice ports.

### Sample Display

The following is a sample display from the **show voice trunk-conditioning supervisory summary** command for voice ports on a Cisco MC3810:

```
router# show voice trunk-conditioning supervisory summary

1/1 is shutdown
1/4 is shutdown
1/5 : state : TRUNK_SC_CONNECT, voice : on , signal : on ,slave
```

The following is a sample display from the **show voice trunk-conditioning supervisory** command for voice port 1/5 on a Cisco MC3810:

```
router# show voice trunk-conditioning supervisory 1/5

1/5 : state : TRUNK_SC_CONNECT, voice : on, signal : on, slave
status: trunk connected
sequence oos : idle and oos
pattern :rx_idle = 0x0 rx_oos = 0xF tx_oos = 0xF
timing : idle = 0, restart = 0, standby = 0, timeout = 40
supp_all = 50, supp_voice = 0, keep_alive = 5
timer: oos_ais_timer = 0, timer = 0
```

The following is a sample display from the **show voice trunk-conditioning supervisory summary** command for voice ports on a Cisco 3600:

```
router# show voice trunk-conditioning supervisory summary

2/0/0 is shutdown
2/0/1 is shutdown
3/0:0 8 is shutdown
3/0:1 1 is shutdown
3/0:2 2 is shutdown
3/0:3 3 is shutdown
3/0:5 5 is shutdown
3/0:6(6) : state : TRUNK_SC_CONNECT, voice : on , signal : on ,master
3/0:7(7) : state : TRUNK_SC_CONNECT, voice : on , signal : on ,master
3/1:0(8) : state : TRUNK_SC_CONNECT, voice : on , signal : on ,master
3/1:1(1) : state : TRUNK_SC_CONNECT, voice : on , signal : on ,master
3/1:3(3) : state : TRUNK_SC_CONNECT, voice : on , signal : on ,master
3/1:5(5) is shutdown
3/1:7(7) is shutdown
```

The following is a sample display from the **show voice trunk-conditioning supervisory** command for voice port 3/0:6 on a Cisco 3600:

```
router# show voice trunk-conditioning supervisory 3/0:6

3/0:6(6) : state : TRUNK_SC_CONNECT, voice : on, signal : on, master
status: trunk connected
sequence oos : idle and oos
pattern :rx_idle = 0x0 rx_oos = 0xF
timing : idle = 0, restart = 0, standby = 0, timeout = 40
supp_all = 0, supp_voice = 0, keep_alive = 5
timer: oos_ais_timer = 0, timer = 0
```

Table 2 explains the fields in the sample output.

**Table 2** Field Descriptions for show voice trunk-conditioning supervisory Command

Field	Description
keep_alive	Signaling packets periodically sent to the far end, even if there is no signal change. These signaling packets function as keepalive messages.
master	The voice port configured as <b>connection trunk xxxx</b> .
slave	The voice port configured as <b>connection trunk xxxx answer-mode</b> .
oos_ais_timer	Time since the signaling packet with AIS indicator was received.
pattern	4-bit signaling pattern.
restart	The restart timeout after far end is OOS.
rx-idle	The signaling bit pattern indicating that the far end is idle.
rx-oos	The signaling bit pattern sent to the PBX indicating that the network is OOS.
standby	The time before the slave side goes back to standby after far end goes OOS.
supp_all	The timeout before suppressing transmission of voice and signaling packets to the far end after detection of PBX OOS.
supp_voice	The timeout before suppressing transmission of voice packet to the far end after detection of PBX OOS.
timeout	The timeout for non-receipt of keepalive packets before the far end is considered to be OOS.
TRUNK_SC_CONNECT	Trunk conditioning supervisory component status.

Related Commands

<b>Command</b>	<b>Description</b>
<b>show dial-peer voice</b>	Displays the configuration for all dial peers configured on the router.
<b>show voice dsp</b>	Shows the current status of all DSP voice channels.
<b>show voice port</b>	Displays configuration information about a specific voice port.
<b>show voice trunk-conditioning signaling</b>	Displays the status of trunk-conditioning signaling and timing parameters for a voice port.

## signal pattern

To configure the ABCD signaling bit pattern for Cisco trunks and FRF.11 trunks, use the **signal pattern** voice-class configuration command. Use the **no** form of this command to restore the default.

```
signal pattern { idle receive | idle transmit | oos receive | oos transmit } bit-pattern
no signal pattern { idle receive | idle transmit | oos receive | oos transmit }
```

### Syntax Description

<b>idle receive</b>	Defines the signaling pattern for identifying an “idle” message from the network. and Defines the idle signaling pattern to be sent to the PBX if the network trunk is out of service and <b>signal sequence oos idle-only</b> or <b>signal sequence oos both</b> is configured.
<b>idle transmit</b>	Defines the signaling pattern for identifying an “idle” message from the PBX.
<b>oos receive</b>	Defines the OOS signaling pattern to be sent to the PBX if the network trunk is out of service and <b>signal sequence oos oos-only</b> or <b>signal sequence oos both</b> is configured.
<b>oos transmit</b>	Defines the signaling pattern for identifying an OOS message from the PBX.
<i>bit-pattern</i>	The ABCD signaling bit pattern. Values are 0000 to 1111.

### Defaults

<b>idle receive</b>	For near-end E&M—0000 (for T1) or 0001 (for E1) For near-end FXO loop start—0101 For near-end FXO ground start—1111 For near-end FXS—0101 For near-end MELCAS—1101
<b>idle transmit</b>	For near-end E&M—0000 For near-end FXO—0101 For near-end FXS loop start—0101 For near-end FXS ground start—1111 For near-end MELCAS—1101

- oos receive** For near-end E&M—1111
- For near-end FXO loop start—1111
- For near-end FXO ground start—0000
- For near-end FXS loop start—1111
- For near-end FXS ground start—0101
- For near-end MELCAS—1111
- oos transmit** No default signaling pattern is defined.

### Command Modes

Voice-class configuration

### Command History

Release	Modification
12.0(3)XG and 12.0(4)T	This command was introduced on the Cisco MC3810.
12.0(7)XK	Default signaling patterns were defined.

### Usage Guidelines

This command defines the signaling patterns that are used to identify the idle and OOS states.

Before configuring the signaling pattern, you must use the **voice class permanent** command in global configuration mode to create a voice class for the Cisco trunk or FRF.11 trunk. After you finish defining the voice class, you will assign it to a dial peer.

To suppress voice packets whenever the transmit or receive trunk is in the idle state, use the **idle receive** and **idle transmit** commands in conjunction with the **signal timing idle suppress-voice** command.

To define the signaling bit patterns to be sent to the PBX when the trunk is out of service, use the **idle receive** and **oos receive** commands.

The **oos receive** pattern is the pattern sent to the PBX to indicate that the network trunk is out of service. The **oos receive** pattern is not used for pattern matching against the signaling packets received from the network.

To “busy out” a PBX if the network connection fails, set the **oos receive** pattern to match the seized state (busy); then set the **signal timing oos** timeout value. When the timeout expires and no signaling packets have been received, the router will send the **idle receive** and/or **oos receive** pattern to the PBX, depending on which pattern is specified by the **signal sequence oos** command.

Use the busy seized pattern only if the PBX does not have a pattern specifically intended to indicate an OOS state. If the PBX has a specific OOS pattern, use that pattern instead.

### Examples

The following example restores default signaling bit patterns for the receive and transmit idle states:

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal timing idle suppress-voice
router(config-class)# no signal pattern idle receive
router(config-class)# no signal pattern idle transmit
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10

```

The following example configures non-default signaling bit patterns for the receive and transmit idle states:

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal timing idle suppress-voice
router(config-class)# signal pattern idle receive 0101
router(config-class)# signal pattern idle transmit 0101
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10

```

The following example restores default signaling bit patterns for the receive and transmit out-of-service states:

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal timing idle suppress-voice
router(config-class)# no signal pattern oos receive
router(config-class)# no signal pattern oos transmit
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10

```

The following example configures non-default signaling bit patterns for the receive and transmit out-of-service states:

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal pattern oos receive 0001
router(config-class)# signal pattern oos transmit 0001
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10

```

## Related Commands

Command	Description
<b>dial-peer voice</b>	Enters dial-peer configuration mode and specifies a dial-peer type.
<b>signal keepalive</b>	Configures the keepalive signaling packet interval for Cisco trunks and FRF.11 trunks.
<b>signal sequence oos</b>	Specifies which signaling pattern is sent to the PBX when the far-end keepalive message is lost or AIS is received from the far end.
<b>signal timing idle suppress-voice</b>	Specifies the length of time before the router stops sending voice packets after a trunk goes into the idle state.
<b>signal timing oos restart</b>	Specifies that a permanent voice connection be torn down and restarted after the trunk has been OOS for a specified time.

<b>signal timing oos slave-standby</b>	Specifies that a slave port return to its initial standby state after the trunk has been OOS for a specified time
<b>signal timing oos suppress-all</b>	Configures the router or concentrator to stop sending voice and signaling packets to the network if it detects a transmit OOS signaling pattern from the PBX for a specified time.
<b>signal timing oos suppress-voice</b>	Configures the router or concentrator to stop sending voice packets to the network if it detects a transmit OOS signaling pattern from the PBX for a specified time.
<b>signal timing oos timeout</b>	Changes the delay time between the loss of signaling packets from the network and the start time for the OOS state.
<b>signal timing idle suppress-voice</b>	Specifies the length of time before voice traffic is stopped after a trunk goes into the idle state.
<b>signal-type</b>	Sets the signaling type to be used when connecting to a dial peer.
<b>voice class permanent</b>	Creates a voice class for a Cisco trunk or FRF.11 trunk.
<b>voice-class permanent</b>	Assigns a previously-configured voice class for a Cisco trunk or FRF.11 trunk to a dial peer.

## signal sequence oos

To specify which signaling pattern is sent to the PBX when the far-end keepalive message is lost or AIS is received from the far end, use the **signal sequence oos** voice-class configuration command. Use the no form of this command to restore the default value.

```
signal sequence oos {no-action | idle-only | oos-only | both}
no signal sequence oos
```

### Syntax Description

<b>no-action</b>	No signaling pattern is sent.
<b>idle-only</b>	Only the idle signaling pattern is sent.
<b>oos-only</b>	Only the out-of-service (OOS) signaling pattern is sent.
<b>both</b>	Both idle and OOS signaling patterns are sent. This is the default value.

### Defaults

Both idle and OOS signal patterns are sent.

### Command Modes

Voice-class configuration

### Command History

Release	Modification
12.0(7)XK	This command was introduced on the Cisco MC3810.

### Usage Guidelines

Before configuring the idle or OOS signal patterns to be sent, you must use the **voice class permanent** command in global configuration mode to create a voice class for the Cisco trunk or FRF.11 trunk. After you finish defining the voice class, you will assign it to a dial peer.

Use this command to specify which signaling pattern(s) to send. Use the **signal pattern idle receive** or the **signal pattern oos receive** command to define the bit patterns of the signaling patterns if other than the defaults.

## Examples

The following example defines voice class 10, sets the **signal sequence oos** to send only the idle signal pattern to the PBX, and applies the voice class configuration to VoFR dial peer 100.

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal sequence oos idle-only
router(config-class)# signal timing idle suppress-voice 5
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10
router(config-dial-peer)# signal-type transparent
    
```

## Related Commands

Command	Description
<b>dial-peer voice</b>	Enters dial-peer configuration mode and specifies a dial peer type.
<b>signal keepalive</b>	Configures the keepalive signaling packet interval for Cisco trunks and FRF.11 trunks.
<b>signal pattern</b>	Configures the ABCD bit pattern for Cisco trunks and FRF.11 trunks.
<b>signal timing idle suppress-voice</b>	Specifies the length of time before the router stops sending voice packets after a trunk goes into the idle state.
<b>signal timing oos restart</b>	Specifies that a permanent voice connection be torn down and restarted after the trunk has been OOS for a specified time.
<b>signal timing oos slave-standby</b>	Specifies that a slave port return to its initial standby state after the trunk has been OOS for a specified time
<b>signal timing oos suppress-all</b>	Configures the router or concentrator to stop sending voice and signaling packets to the network if it detects a OOS signaling pattern from the PBX for a specified time.
<b>signal timing oos suppress-voice</b>	Configures the router or concentrator to stop sending voice packets to the network if it detects a transmit OOS signaling pattern from the PBX for a specified time.
<b>signal timing oos timeout</b>	Changes the delay time between the loss of signaling packets from the network and the start time for the OOS state.
<b>signal-type</b>	Sets the signaling type to be used when connecting to a dial peer.
<b>voice class permanent</b>	Creates a voice class for a Cisco trunk or FRF.11 trunk.
<b>voice-class permanent</b>	Assigns a previously-configured voice class for a Cisco trunk or FRF.11 trunk to a dial peer.

## signal timing idle suppress-voice

To specify the length of time before the router stops sending voice packets after a trunk goes into the idle state (no call in progress), use the **signal timing idle suppress-voice** voice-class configuration command. Use the **no** form of this command to restore the default value.

**signal timing idle suppress-voice** *seconds*  
**no signal timing idle suppress-voice**

### Syntax Description

*seconds* Duration of the idle state in seconds before the transmission of voice packets is stopped. The range is 0 to 65535.

### Defaults

The router or concentrator continues to send voice packets when the trunk is idle.

### Command Modes

Voice-class configuration

### Command History

Release	Modification
12.0(3)XG	This command was introduced on the Cisco MC3810.
12.0(7)XK	This command was modified to simplify the configuration process.

### Usage Guidelines

Before configuring the signal timing idle suppress-voice timer, you must use the **voice class permanent** command in global configuration mode to create a voice class for the Cisco trunk or FRF.11 trunk. After you finish defining the voice class, you will assign it to a dial peer.

This command is used when the **signal-type** command is set to **transparent** in the dial peer for the Cisco trunk or FRF.11 trunk connection. When the router or concentrator stops sending voice packets after the specified time, signaling packets continue to be sent.

To detect an idle trunk state, the router or concentrator monitors both transmit and receive signaling for the **idle transmit** and **idle receive** signaling patterns. These can be configured by the **signal pattern idle transmit** or **signal pattern idle receive** command, or they can be the defaults. The default **idle receive** pattern is the idle pattern of the local voice port. The default **idle transmit** pattern is the idle pattern of the far-end voice port.

## Examples

The following example defines voice class 10, sets the idle detection time to 5 seconds, configures the trunk to use the default transmit and receive idle signal patterns, and applies the voice class configuration to VoFR dial peer 100.

```

router(config)# voice class permanent 10
router(config-class)# signal keepalive 3
router(config-class)# signal timing idle suppress-voice 5
router(config-class)# exit
router(config)# dial-peer voice 100 vofr
router(config-dial-peer)# voice-class permanent 10
router(config-dial-peer)# signal-type transparent
    
```

## Related Commands

Command	Description
<b>dial-peer voice</b>	Enters dial-peer configuration mode and specifies a dial peer type.
<b>signal keepalive</b>	Configures the keepalive signaling packet interval for Cisco trunks and FRF.11 trunks.
<b>signal pattern</b>	Configures the ABCD bit pattern for Cisco trunks and FRF.11 trunks.
<b>signal sequence oos</b>	Specifies which signaling pattern is sent to the PBX when the far-end keepalive message is lost or AIS is received from the far end.
<b>signal timing idle suppress-voice</b>	Specifies the length of time before the router stops sending voice packets after a trunk goes into the idle state.
<b>signal timing oos restart</b>	Specifies that a permanent voice connection be torn down and restarted after the trunk has been OOS for a specified time.
<b>signal timing oos slave-standby</b>	Specifies that a slave port return to its initial standby state after the trunk has been OOS for a specified time
<b>signal timing oos suppress-all</b>	Configures the router or concentrator to stop sending voice and signaling packets to the network if it detects a transmit OOS signaling pattern from the PBX for a specified time.
<b>signal timing oos timeout</b>	Changes the delay time between the loss of signaling packets from the network and the start time for the OOS state.
<b>signal-type</b>	Sets the signaling type to be used when connecting to a dial peer.
<b>voice class permanent</b>	Creates a voice class for a Cisco trunk or FRF.11 trunk.
<b>voice-class permanent</b>	Assigns a previously-configured voice class for a Cisco trunk or FRF.11 trunk to a dial peer.

## Debug Commands

This section documents new or modified commands. All other commands used on these platforms are documented in the Cisco IOS Release 12.0 command reference publications.

- `debug vpm trunk_sc`

## debug vpm trunk\_sc

Use the **debug vpm trunk\_sc** privileged EXEC command to enable the display of trunk conditioning supervisory component trace information. The **no** form of this command disables the display of this information.

```
debug vpm trunk_sc
no debug vpm trunk_sc
```

### Syntax Description

This command has no arguments or keywords.

### Defaults

Trunk conditioning supervisory component trace information is not displayed.

### Command History

Release	Modification
12.0(7)XK	This command was introduced on the Cisco 2600, 3600, and MC3810 platforms.

### Usage Guidelines

Use the **debug vpm port** command with the *slot-number/subunit-number/port* argument to limit the **debug vpm trunk\_sc** debug output to a particular port. If you do not use the **debug vpm port** command, the **debug vpm trunk\_sc** displays output for all ports.

Execution of **no debug all** will turn off all port level debugging. It is usually a good idea to turn off all debugging and then enter the debug commands you are interested in one by one. This will help to avoid confusion about which ports you are actually debugging.

### Examples

The following example shows **debug vpm trunk\_sc** messages for port 1/0/0 on a Cisco 2600 or 3600 series router:

```
router# debug vpm trunk_sc
router# debug vpm port 1/0/0
```

The following example shows **debug vpm trunk\_sc** messages for port 1/1 on a Cisco MC3810:

```
router# debug vpm trunk_sc
router# debug vpm port 1/1
```

The following example turns off **debug vpm trunk\_sc** debugging messages:

```
router# no debug vpm trunk_sc
```

## Related Commands

<b>Command</b>	<b>Description</b>
<b>debug vpm all</b>	Enables all VPM debugging
<b>debug vpm port</b>	Limits the <b>debug vpm trunk_sc</b> command to a specified port.
<b>show debug</b>	Shows which debug commands are enabled.

